

NEW AND LITTLE KNOWN APHIDS FROM PAKISTAN (HOMOPTERA, APHIDIDAE)

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ABSTRACT

In this paper the following new genera and species are described from Northern Pakistan.

Aphis longituba spec. nov., from unidentified herbaceous climber; *Ceruraphis eastopi* spec. nov., from *Viburnum cotinifolium*; *Chaitophorus kapuri* spec. nov., from *Populus ciliata*; *Chaitophorus nigrinus* spec. nov., from *Salix* sp.; *Chaitophorus pakistanicus* spec. nov., from *Salix acmophylla* and *S. tetrasperma*; *Cinara lachnistrostris* spec. nov., from *Pinus* (probably *wallichiana*); *Cinara maculipes* spec. nov., from *Pinus wallichiana*; *Epipemphigus* gen. nov., type-species *Pemphigus imaicus* Cholodkovsky, 1912; *Globulicaudaphis* gen. nov., type-species *Globulicaudaphis pakistanica* spec. nov., from *Quercus* (probably *dilatata*); *Macrosiphum pachysiphon* spec. nov., from *Rubus lasiocarpus*; *Liosomaphis atra* spec. nov., from *Berberis* sp.; *Matsumuraja capitophoroides* spec. nov., from *Rubus lasiocarpus* and *Rubus* sp.; *Periphyllus vandenboschi* spec. nov., from *Acer* sp.; *Pseudessigella* gen. nov., type-species *Pseudessigella brachychaeta* spec. nov., from *Pinus wallichiana*.

Some notes on the identity of *Chaitophorus himalayensis* (Das, 1918), often mistaken for *C. pakistanicus* spec. nov., are given. It is suggested that *Hayhurstia tataricae* Aizenberg, 1935, from *Lonicera tatarica* is a synonym of *Brevicoryne coriandri* Das, 1918, from *Coriandrum*, referred to *Hyadaphis* Kirkaldy, 1904, type-species *Aphis xylostei* Schrank, 1801, of which genus *Neohayhurstia* Aizenberg, 1954, type-species *Hayhurstia tataricae* Aizenberg, 1935, becomes a synonym. The fundatrix of *Epipemphigus imaicus* (Cholodkovsky, 1912) is described for the first time, and a key to the apterous females of *Matsumuraja* Schumacher, 1921, is given.

Introduction

Dr. R. VAN DEN BOSCH, Berkeley, California, managed to collect, during a short stay in Northern West Pakistan, a considerable number of aphid samples which he most kindly gave to me for identification. Where not otherwise indicated, all the material originates from this collector. Several undescribed species which were already familiar to me from material received from my colleagues Mr. A. N. BASU and Mr. K. D. VERMA, will later be described by them. Other species are described here, partly also from material received for identification from the Commonwealth Institute for Biological Control.

Types of new species are in the author's collection, with the exception of those of *Ceruraphis eastopi* spec. nov.

Aphis longituba spec. nov.

Apterous viviparous female.

In life pale green, mottled with darker green on abdomen; appendages pale

except siphunculi which are black-tipped. In mounted specimens body oval, about 1.3—1.6 mm long. Tergum completely unpigmented. Extremely small marginal tubercles present, on abdominal segment I, where they are but little wider in diameter than the papilla of a marginal hair but rather taller than their basal width, and on segment VII, where they are a little wider than the porus of the nearest stigma. Dorsal hairs scarce, those on abdominal tergite III about 0.016—0.025 mm long, stiff, subacute, but the 2 hairs on tergite VIII up to 0.060 mm long; marginal hairs on tergites II—IV usually in double pairs, sometimes in a single pair on tergite III. Front slightly sinuated. Antennae pale with the processus terminalis faintly smoky; flagellum imbricated; processus terminalis at most as long as segment III, usually shorter, $2-2\frac{1}{2}$ times base of segment VI; hairs on segment III scarce (e.g. 7 or 9), half as long as basal diameter of the segment. Rostrum just reaching the hind coxae; last segment rather long, about $1\frac{1}{5}-1\frac{1}{4}$ times as long as second joint of hind tarsi, with 2, more rarely 3 hairs besides the 3 subapical pairs. Siphunculi quite pale with apical $\frac{1}{8}-\frac{1}{6}$ blackish, gradually tapering from base to apex, in the middle about $1\frac{1}{4}$ times as wide, at apex about as wide as the hind tibiae, imbricated, with rather small flange, about $\frac{1}{5}-\frac{2}{9}$ of length of body, $2\frac{2}{3}-3\frac{1}{4}$ times as long as cauda. Cauda small, at base about twice as wide as middle of siphunculi, more or less like that of *Aphis gossypii* Glover, cylindrical to tapering with rounded top, with 5—6 hairs. Legs rather long, pale with brownish tarsi; trochanter and femora on the underside with at least a few hairs fine and long, longer than the basal width of a femur; tibial hairs rather like those of *A. gossypii*, short; first tarsal joints with 3, 3, 2 hairs, second joints markedly imbricated.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda
			III	IV	V	VI		
1.	1.50	1.02	0.29	0.16	0.15	(0.10 + 0.22)	0.33	0.12
2.	1.42	0.95	0.23	0.15	0.13	(0.11 + 0.22)	0.30	0.11
3.	1.32	1.00	0.25	0.17	0.14	(0.10 + 0.24)	0.32	0.10
4.	1.46	0.91	0.25	0.13	0.12	(0.09 + 0.21)	0.32	0.12
5.	1.45	1.00	0.28	0.17	0.13	(0.11 + 0.23)	0.33	0.12
6.	1.47	0.95	0.25	0.13	0.14	(0.09 + 0.23)	0.32	0.13

(1—6, from an unidentified plant, Murree, West Pakistan, 3.VII.1964).

Discussion. This *Aphis* was collected from the curled tender tips (undersides) of a vine-like herbaceous plant. Species of the genus with such long, slender siphunculi that are pale are scarce, and I know of no other than *A. farinosa* Gmelin, very different as to marginal tubercles, and *A. idaei* v. d. Goot which has much thinner siphunculi. Some species of the group infesting *Ribes* and *Onagraceae* have such long pale siphunculi, but these always have more than 3 hairs on the basal half of the last rostral segment and longer antennal hairs. The long pale siphunculi with their conspicuously dark tips, and the small cauda, together

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with the scarcity of marginal tubercles and the few rostral hairs make recognition of the species within the very large genus *Aphis* L. quite easy.

Types. Holotype: apterous viviparous female (measurements no. 1), from an unidentified plant, Murree, West Pakistan, 3.VII.1964 (R. VAN DEN BOSCH), P-VII-3a. Paratypes: 6 apterae viviparae with data as for the holotype.

Ceruraphis eastopi spec. nov.

(Fig. 1—2, p. 208)

Alate viviparous female.

Colour in life not known. In mounted specimens body about 2.70—3.15 mm long, elongated. Head and thorax blackish sclerotic; abdomen with extensive darkish dorsal sclerotisation consisting of thick spino-pleural bars which are mutually free on tergites I and II, but except medially sometimes almost completely fused on tergites III—VI. Marginal tubercles variable, sometimes on all segments from I—VII, but always on II—IV, low, flat, on segments II—IV about 0.015 mm in diameter. Spinal tubercles very small, very irregularly present on tergites I—VIII, mesonotum or vertex. Dorsal hairs fine, on tergite III up to 0.045 mm long; tergite IV with mostly single spinal and pleural pairs, but with up to 8 marginal pairs, on more anterior tergites usually with several additional spinal and pleural hairs; tergite VIII with 4—5 hairs. Posterior row of 6—8 hairs on vertex remarkably far from posterior margin of head. Front sinuated. Antennae blackish, about $\frac{3}{5}$ of length of body; segment III on basal one-third distinctly imbricated, with about 15—23 rather protruding, mostly large and partly markedly transversely oval rhinaria over whole length; segment IV with 1—5, rarely without such rhinaria; segment V rarely with a secondary rhinarium, but with an enormous primary rhinarium of about 0.10 mm long and 0.035 mm wide (Fig. 1), covering up to half the length of the segment; segment VI with a hardly smaller primary rhinarium, which covers much more than half the basal portion of the segment; hairs on segment III rather bent and adpressed, up to just longer than basal diameter of the segment. Rostrum reaching to half way the middle coxae; last segment rather elongated, about $\frac{10}{11}$ of second joint of hind tarsi, with 2 hairs besides the 3 subapical pairs. Siphunculi tapering from base to apex or slightly constricted at base, dark, about $\frac{1}{15}$ of length of body, in the middle $\frac{11}{10}$ — $\frac{11}{5}$ times as thick as middle portion of hind tibiae, dorsally from base to apex with a few wavy transverse lines of bluntish spinules, ventrally with very dispersed imbrications bearing few blunt spinules, and these imbrications near apex running together to form cells (Fig. 2); flange hardly indicated. Cauda $\frac{2}{3}$ — $\frac{4}{5}$ of siphunculi, dark, triangular with convex sides, rather acute, with 5 hairs. Legs rather long; femora blackish with pale base; tibiae dark with blackish base and apex; the hind tibiae over most of their length, the other tibiae near base, with a very curious, vague, wavy transverse striation similar to that on distal two-thirds of antennal segment III; first tarsal joints with 3, 3, 2 hairs. Venation of wings normal; subcostal vein system and pterostigma conspicuously pale.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda	Rhin. on segments		
			III	IV	V	VI			III	IV	V
1.	3.11	1.88	0.47	0.25	0.23	(0.15 + 0.60)	0.17	0.12	16 & 18	2 & 4	0 & 0
2.	2.92	1.74	0.38	0.21	0.22	(0.15 + 0.61)	0.16	0.13	16 & 16	3 & ?	0 & ?
3.	2.73	1.69	0.36	0.21	0.21	(0.15 + 0.60)	0.16	0.13	21 & 23	1 & 5	0 & 0
4.	2.77	1.72	0.39	0.22	0.20	(0.16 + 0.59)	0.17	0.13	14 & 16	3 & 4	0 & 0
5.	2.82	1.74	0.40	0.20	0.21	(0.16 + 0.61)	0.16	0.13	21 & 22	1 & 3	0 & 0
6.	2.85	1.71	0.38	0.20	0.21	(0.16 + 0.60)	0.16	0.13	15 & 17	3 & 4	0 & 1

(1—6, from *Viburnum cotinifolium*, Otroro, West Pakistan, 12.IX.1962, Commonwealth Inst. Biol. Control, C.I.E. no. 18753: 847).

Larvae.

Embryos in alatae. Antennae of 4? segments; processus terminalis (fully stretched) only 1.4 times base of last segment; base with one stout and one small hair; penultimate segment with two stout, and one small hair, last rostral segment 0.065, with two hairs besides the 3 subapical pairs.

Alatoid nymphs, last instar. On abdomen with small dark marginal sclerites bearing mostly 1 or 2 hairs and a tubercle. Spinally especially on the posterior tergites, from IV or V caudad, with very small, caudad much larger sclerites bearing one hair each, and besides, especially on tergites VII and VIII, a spinal tubercle; all tubercles more pronounced, and larger than in most adults. Primary rhinaria on antennal segments V and VI round, ciliate, rather large, about 0.025—0.035 mm across the rims. Hind tibiae without spinules. As in other species of the genus there is an unusually large distance between the first and the second pair of coxae.

Discussion. The eight alatae that were collected evidently were not gynoparae returned from their secondary host plant, for the same sample contained a number of almost mature alatoid nymphs. Therefore the specimens must have developed on *Viburnum*. Notwithstanding the date of collecting, the fact that only alatae, and only alatoid nymphs were found, seems to suggest host alternation. Perhaps the specimens were leaving *Viburnum* for a secondary host plant. In other species of the genus the host plants are Cyperaceae, rarely Juncaceae. Indeed Dr. REMAUDIÈRE has collected a *Ceruraphis* on some species of *Carex* in Iran which might be this species, but the alatae lack the gigantic primary rhinaria of *C. eastopi*.

These rhinaria make recognition of the described morph very easy, for to my knowledge no other member of this subfamily with such primary rhinaria has been described. However, almost certainly other morphs do not have such unusual rhinaria: in the alatoid nymphs the primary rhinaria are of ordinary shape. The sculpture of the siphunculi may be useful for identifying the other morphs when these are found.

The very short processus terminalis in the embryos inside the described alatae suggests that in apterae the processus terminalis is much shorter than in the described alatae. When the apterae are found they could be identified by the curious mixture of short and long hairs on the last two antennal segments of the embryos that they contain.

The species is named after Dr. V. F. EASTOP, British Museum (Natural History), London.

Types. Holotype: alate viviparous female (measurements no. 1), from *Viburnum cotinifolium*, Otroro, West Pakistan, 12.IX.1962 (Commonwealth Inst. Biol. Control, C.I.E. no. 18753: 847). Paratypes: 7 alatae and 7 alatoid nymphs with data as for the holotype. The holotype and all but two alate paratypes are in the British Museum (Natural History), London.

Chaitophorus himalayensis (Das, 1918)

DAS (1918) mentions in his description of *Eichochaitophorus himalayensis* that the siphunculi in the apterae viviparae are brown. The processus terminalis is about $2\frac{1}{2}$ times as long as the base of antennal segment VI. These characters do not apply to material identified by TAKAHASHI and recorded by him from Siam, and to other specimens identified as *himalayensis* Das, from Pakistan and India.

Material of a species from *Salix* from India agrees with the description of *himalayensis* by DAS in the pigmentation of the siphunculi and the length of the processus terminalis. The first tarsal joints of the apterae viviparae have 7 hairs, and the abdominal dorsum is distinctly nodulose.

Chaitophorus kapuri spec. nov.

Apterous viviparous female.

Colour in life not noted, but presumably largely blackish. Mounted specimens dorsally dark to blackish sclerotic with the head laterally, and a not sharply bordered median area from metanotum to about tergite III distinctly paler to pale. Abdominal tergites II—VI solidly fused, the other tergites mutually free. Dorsum not smooth but rather evenly covered with mostly irregularly arranged, not joined, semiobtusate to blunt spinules which in lateral view are little more than half as high as their basal width; locally these spinules are arranged in wavy transverse lines. Dorsal hairs acute or somewhat acuminate, stiff, not wavy; the longest spinal hairs on abdominal tergite III up to 6 times basal diameter of antennal segment III. Antennae about $\frac{5}{7}$ — $\frac{2}{3}$ of length of body, with segment I and the part near the rhinaria on segment VI dusky to dark, the rest quite pale, slightly imbricated; segment III with on inner side 2—4 hairs of about $3\frac{3}{4}$ times basal diameter of the segment, and with some much shorter hairs rather similar to those on outer side which are about as long as basal diameter of the segment; base of segment VI with 2—3 hairs, the longest of which is $\frac{12}{3}$ —2 times the shortest; for interrelation of antennal segments vide measurements. Last rostral segment about as long as second joint of hind tarsi, with 2—4 hairs besides the 3 subapical pairs. Siphunculi very short, blackish, not surrounded by a membranous ring, with 3—4 rows of transverse reticulations apically that are only well visible in lateral view. Cauda rather pale, distinctly knobbed, with the knob usually wider than long. Legs completely pale with only the apices of the tarsi slightly dusky; tibiae with a few short spinules at the very tip; first tarsal joints with 7, 7, 7 hairs; empodial hairs ribbon-shaped.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda
			III	IV	V	VI		
1.	1.53	1.11	0.29	0.14	0.14	(0.10 + 0.33)	0.05	0.11
2.	1.86	1.20	0.33	0.15	0.14	(0.10 + 0.34)	0.06	0.12
3.	1.57	1.16	0.31	0.16	0.14	(0.11 + 0.32)	0.06	0.10
4.	1.56	1.14	0.30	0.16	0.13	(0.11 + 0.33)	0.06	0.10
5.	1.95	1.34	0.37	0.21	0.15	(0.11 + 0.35)	0.07	0.10
6.	1.92	1.14	0.36	0.20	0.15	(0.11 + 0.32)	0.07	0.10

(1—4, from *Populus ciliata*, Murree (7000 ft), Pakistan, 30.VI.1964 (R. VAN DEN BOSCH); 5—6, from *Populus*, Manali (6000 ft), India, 25.VI.1955 (A. P. KAPUR)).

Alate viviparous female.

Colour in life not noted. Mounted specimens with black head and thorax, with on the abdominal dorsum thick spino-pleural, blackish, transverse bars from segment II or III to VIII, which bars tend to fuse to a central sclerite from tergites III to VI; marginal abdominal sclerites blackish, on segments II—V each with 6—11 hairs and on the posterior part with a very slender tubercle that often looks like the socket of a large hair with the shaft broken near the base. Antennae $3/4$ — $5/6$ of the length of body, pigmented as in apterae, but with also the apex of segment V somewhat darkened; hairs on inner side of segment III considerably shorter than in apterae, but still up to $3\frac{1}{2}$ times as long as basal diameter of segment III because the latter is constricted at base; segment III with about 10—12 rather large rhinaria more or less in a row over the length of the segment. Siphunculi conical, nearly as long as their basal width, dark, with 3—4 rows of basad transverse reticulations. Legs pallid as in apterae. Wings with normal venation, the veins very conspicuously and rather broadly darkly bordered.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda	Rhin. on III
			III	IV	V	VI			
1.	1.70	1.29	0.35	0.18	0.15	(0.11 + 0.36)	0.07	0.10	12 & 12
2.	1.64	1.17	0.35	0.16	0.13	(0.10 + 0.30)	0.08	0.10	10 & 12
3.	1.62	1.30	0.33	0.19	0.15	(0.12 + 0.38)	?	0.09	10 & 11
4.	1.63	1.27	0.37	0.17	0.14	(0.11 + 0.34)	0.07	0.09	10 & ?

(1—4, with apterae no. 1—4).

Larvae.

In mounted specimens head darkish, the rest pale, without dark scleroites at the bases of the dorsal hairs. Siphunculi blackish, apparently reticulated before adulthood.

Discussion. The insects infest the undersides of the leaves of *Populus ciliata*. No data are available on the attendance by ants. The completely unpigmented legs,

in sharp contrast to the dark body, and the strongly bordered veins of the wings make recognition of this species very easy.

Types. Holotype: apterous viviparous female (measurements no. 1), from *Populus ciliata*, Murree (7000 ft), West Pakistan, 30.VI.1964. Paratypes: apterae and alatae with the same collecting data.

Chaitophorus nigritus spec. nov.

Apterous viviparous female.

In life black with pale legs and antennae. In mounted specimens tergum evenly black with the head laterally just paler. Abdominal tergites II to VI completely fused, the rest mutually free. Tergum with very small bluntish nodules that are joined to wavy lines that mostly medially run more or less parallel, with on the thorax here and there a faint tendency to reticulation. Dorsal hairs slightly flexed, with fine apices; the longest spinal hairs on abdominal tergite III about 5 times as long as basal diameter of antennal segment III. Antennae pale with segment I, the distal half of the processus terminalis and sometimes the area near the rhinaria on the last segment dusky to dark, sometimes on one side of 5 segments, $1\frac{1}{2}$ — $\frac{5}{8}$ of the length of body; segment III on inner side with 3—6 hairs of up to $2\frac{1}{2}$ —3 times basal diameter of the segment and with some shorter ones that yet are $1\frac{1}{2}$ times or more times that diameter and considerably longer than those on outer side which are mostly shorter than that diameter; the longest of the 2, rarely 3 hairs on the base of the last segment $2\frac{1}{2}$ —3 times as long as the shortest. Last rostral segment very nearly as long as second joint of hind tarsi, with 2 hairs besides the 3 subapical pairs; one pair of the latter placed very far basad. Siphunculi black, surrounded by a membranous area, more or less conical, distinctly reticulated on distal half. Cauda knobbed, pale with dusky knob, the latter wider than long. Legs pale with the tarsi wholly or distally dusky; tibiae only at the very apex with some spinules; first tarsal joints with 5 hairs; empodial hairs setaceous, blunt to acute.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda
			III	IV	V	VI		
1.	1.30	0.73	0.16	0.09	0.10	(0.09 + 0.22)	0.04	0.05
2.	1.13	0.67	0.15	0.08	0.10	(0.08 + 0.18)	0.04	0.05
3.	1.36	0.75	0.17	0.09	0.09	(0.09 + 0.22)	0.04	0.05
4.	1.39	0.78	0.18	0.10	0.09	(0.09 + 0.21)	0.04	0.05
5.	1.11	0.63	0.12	0.09	0.08	(0.08 + 0.18)	0.03	0.04
6.	1.42	0.80	0.17	0.10	0.10	(0.09 + 0.23)	0.05	0.05

(1—6, from *Salix* sp., Murree (7500 ft), Pakistan, 27.VI.1964).

Intermediate.

Like apterae viviparae, but thorax rather like that in alatae, with small wing-pads. Antennae with 8 and 11 small secondary rhinaria on segment III, with 2 and 2 on IV, and with 0 and 1 on V.

Larvae.

From birth with black scleroites to the bases of the dorsal hairs.

Discussion. According to its collector the aphids live most characteristically in tight colonies around galls on the leaves of *Salix* sp. No data on myrmecophily are available.

In structure and ornamentation of the dorsum this species strongly resembles *Chaitophorus salicti* (Schrank, 1801), but it can at once be distinguished by the membranous ring around the siphunculi, the shorter, less hairy last rostral segment and unpigmented legs in, otherwise, solidly black specimens.

Types. Holotype: apterous viviparous female (measurements no. 1), from *Salix* sp., Murree (7500 ft), West Pakistan, 27.VI.1964. Paratypes: apterae viviparae with the same collecting data.

Chaitophorus pakistanicus spec. nov.

Apterous viviparous female.

Colour in life not known, but almost certainly greenish or yellowish. Mounted specimens completely pale. Integumentum dorsally virtually smooth. Dorsal hairs variable in length, stiff, mostly rather thick, the marginal ones acute, the rest rarely partly acute, normally either partly acuminate or all with furcated apices; longest spinal hairs on abdominal tergite III from 3—5½ times basal diameter of antennal segment III. Antennae 4/9—5/9 of length of body, always with the area near the rhinaria on segment VI and the apical half of the processus terminalis dark or dusky, sometimes with segment I, the apex of segment V, and the whole segment VI, dusky; base of segment III slightly attenuated; that segment on inner side with 2—5 rather stiff hairs with bluntish apices that are 1½—2 times basal diameter of the segment, often hardly longer than some hairs on the outer side; basal part of segment VI with 2 rather short hairs of about equal length; processus terminalis 13/5—21/5 times base of last segment. Last rostral segment only 3/4—5/6 of second joint of hind tarsi, with 2 long hairs as long as the longest of the 3 subapical pairs; of the latter one pair placed far basad. Siphunculi not pigmented, very small, truncated conical or cylindrical, with only 2—3 rows of transverse reticulation at apex. Cauda pale, knobbed, the knob broader than long. Legs pale with dusky second tarsal joints; tibiae smooth, in some of the specimens from Kashmir with a few pseudosensoria; first tarsal joints with 5 hairs; empodial hairs thinly setaceous.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda
			III	IV	V	VI		
1.	1.67	0.93	0.25	0.13	0.12	(0.10 + 0.20)	0.06	0.10
2.	1.72	0.88	0.23	0.12	0.11	(0.09 + 0.19)	?	0.10
3.	1.52	0.81	0.25	0.12	0.10	(0.09 + 0.14)	0.06	0.10
4.	1.64	0.79	0.21	0.11	0.10	(0.09 + 0.17)	0.06	0.10
5.	1.50	0.68	0.20	0.09	0.09	(0.08 + 0.12)	0.06	0.10
6.	1.48	0.79	0.22	0.12	0.11	(0.08 + 0.14)	0.06	0.10

(1—2, from *Salix acmophylla*, Mardan, Pakistan, 3.XII.1962 (Commonwealth Inst. Biol. Control); 3—4, from *Salix acmophylla*, Hangu, Pakistan, 9.XII.1962 (Commonwealth Inst. Biol. Control); 5—6, from *Salix tetrasperma*, Jammu, Kashmir, 24.II.1964 (K. D. VERMA)).

Oviparous female.

Mounted specimen similar to apterous viviparous female, but body larger, cauda not constricted, hind tibiae swollen with about 40 pseudosensoria.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda
			III	IV	V	VI		
1.	1.98	0.92	0.25	0.14	0.12	(0.10 + 0.19)	0.04	0.10

(1, with apterae 3—4).

Larvae.

Dorsal hairs without pigmented sclerites at their bases. First two antennal segments often brownish.

Discussion. The few records published after that of DAS (1918) of *Chaitophorus himalayensis* (Das) probably relate to the present species, which in many respects agrees with the description by that author, except for its pale siphunculi and shorter processus terminalis. Specimens from *Salix*, Chiangmai, Thailand, 5.V.1940, received from Dr. TAKAHASHI and identified and recorded by him as *Chaitophorus himalayensis* (Das) differ slightly from the material described above by having a few more hairs on antennal segment III.

In a number of characters the new species agrees with colourless specimens of *Chaitophorus salicti* (Schrank), but the short last rostral segment and almost smooth abdominal tergum, as well as the short processus terminalis make recognition easy.

Types. Holotype: apterous viviparous female (measurements no. 1), from *Salix acmophylla*, Mardan, Pakistan, 3.XII.1962 (Commonwealth Inst. Biol. Control). Paratypes: apterae viviparae with collecting data as above; from *Salix acmophylla*, Hangu, Pakistan, 9.XII.1962 (Commonwealth Inst. Biol. Control); from *Salix tetrasperma*, Jammu, Kashmir, 24.II.1964 (K. D. VERMA).

Cinara lachnirostris spec. nov.

Apterous viviparous female.

In life small, darkish brown. Mounted specimens pale, with the head, pronotum, mesothoracic furca, the customary six longitudinal rows of small, roundish pleural intersegmental sclerites ("Muskelpplatten") more or less dark brown, the siphuncular cones and a broken bar across abdominal tergite VIII light brown, and very vague, mottled pleuro-marginal areas on the mesonotum. Dorsal skin with even, very fine reticulation. Dorsal hairs on the thorax stiff, spinally somewhat acuminate

and not longer than basal diameter of antennal segment III, marginally acute and up to $1\frac{1}{2}$ times that diameter; on the disc of abdomen caudad gradually shorter and blunter, till on tergite V the hairs are quite blunt and cylindrical and down to $\frac{1}{3}$ or even $\frac{1}{4}$ the mentioned diameter, from where they again increase in length till on tergite VIII they are as long as the marginal hairs on abdomen and thorax; the short spinal hairs with dark sockets but not on sclerotic platelets. Ventral hairs much more numerous than dorsal hairs, about twice the mentioned diameter. Head not with a median suture, with acute thorny hairs like the spinal thoracic hairs. Antennae rather long, more than half as long as body with segment I as dark brown as the head, the other segments gradually darker towards segment VI which is mostly paler than segment I; segment VI always longer than segment V, the latter longer than segment IV which is $\frac{1}{3}$ — $\frac{2}{5}$ of segment III; segment VI with small, roundish imbrications which begin to become apparent on distal half of segment V; the rest smooth; secondary rhinaria variable in number; processus terminalis at base as wide as the part below the rhinaria, 2 — $2\frac{1}{2}$ times as long as its basal width, $\frac{1}{3}$ — $\frac{2}{5}$ of the total length of the segment, with 8—11 short spiny hairs; hairs on segment III stiff, acuminate, the shortest only half basal diameter of the segment, most of them about equal to that diameter, the longest hairs $1\frac{1}{2}$ times that diameter. Rostrum long, reaching to about abdominal sternite VI or VII, with surprisingly short ultimate segments; segment IV with 6 hairs besides the 3 pairs at the junction of "IV and V"; about $1\frac{1}{2}$ times as long as its basal width; IV + V about $\frac{3}{4}$ of the length of second joint of hind tarsi. No trace of a mesosternal processus present. Siphuncular cones quite small, often inconspicuous, in diameter just smaller than the length of rostral segment IV, with only about 25 hairs of the ventral type. Cauda normal. Legs rather thick, with the femora dark to blackish brown with the very base pale, tibiae with dark bases and apices, on the fore and middle legs the middle part brownish yellow, on the hind tibiae somewhat paler just past the base, but the rest gradually darker towards apex; hairs on basal half of hind tibiae stiff and acuminate, considerably shorter than width of tibiae; first tarsal joints with very numerous hairs and two short spines, ventrally about $1\frac{2}{3}$ times as long as dorsally, 5 times as long as the width at the basal articulation; empodial hairs just over half as long as the sclerite on which they are placed.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Diam. siph.	Cauda	Rhin. on		
			III	IV	V	VI			III	IV	V
1.	2.57	1.40	0.49	0.18	0.25	0.28	0.15	0.11	0 & 0	2 & 3	0 & 1
2.	2.83	1.55	0.57	0.20	0.26	0.30	0.16	0.11	3 & 3	2 & 2	1 & 0
3.	2.56	1.48	0.52	0.21	0.23	0.30	0.15	0.09	0 & 0	0 & 0	0 & 0
4.	2.47	1.39	0.51	0.17	0.23	0.28	0.14	0.08	0 & 0	0 & 0	0 & 0
5.	2.49	1.51	0.55	0.19	0.26	0.31	0.15	0.10	0 & 0	0 & 0	0 & 0
6.	2.51	1.40	0.49	0.19	0.23	0.29	0.14	0.11	0 & 0	0 & 0	0 & 0

(1—6, from *Pinus* (probably *wallichiana*, syn. *excelsa*), Murree (7000 ft), Pakistan, 3.VII.1964).

Discussion. The new species can easily be distinguished from other Palaearctic species by the combination of very small siphuncular cones with the unusually long antennal segment VI and short dorsal hairs.

Types. Holotype: apterous viviparous female (measurements no. 3), from *Pinus (wallichiana, syn. excelsa?)*, Murree (7000 ft), West Pakistan, 3.VII.1964 (R. VAN DEN BOSCH), no. P-3d. Paratypes: apterae viviparae with collecting data as for holotype.

Cinara maculipes spec. nov.

Apterous viviparous female.

In life pale brown. In mounted specimens head, pronotum and mesonotum somewhat mottled light brown; the small, roundish pleural intersegmental sclerites ("Muskelpatten") dark brown; the small siphuncular cones, an interrupted bar across tergite VIII and the subgenital plate pale brownish; no further pigmentation present. Dorsum medially with fields of very fine reticulation. Dorsal hairs very stiff and thorny, on the mesonotum spinally and marginally about half as long as basal diameter of antennal segment III, on the disc of the abdomen only $1/4$ — $1/3$ of that diameter, on tergite VIII as long as on mesonotum; hairs on sclerotic parts with a diffuse darker brownish zone around their bases, on membranous parts with dark sockets and a very small dark area around the socket. Ventral hairs also thorny, up to $12/5$ times the mentioned diameter. Head with distinct, complete median suture, with hairs up to just longer than the mentioned diameter. Antennae about $2/5$ — $4/9$ of length of body, pale, with segment I light brown like the head, tip of IV, most of V and the whole of VI blackish brown; segment VI, and segment V distally imbricated, the rest smooth; for interrelation of segments see measurements; processus terminalis at base much (about $3/8$) thinner than part basad of the rhinaria, a little less than $1/3$ of the length of segment, with 9—12 thorns; secondary rhinaria mostly absent; only no. 3 of the measurements with 1 and 2 rhinaria on segment IV; antennal hairs thorny, the longest on segment III $4/5$ of basal diameter of the segment, but most of them much shorter. Rostrum reaching to abdominal sternite II or III; last joint short, "IV + V" only half as long as second joint of hind tarsi, with 6 long and fine hairs besides the 3 pairs at the junction of IV and V; V about $1 1/2$ times as long as its largest width. No trace of a mesosternal processus. Siphunculi on slightly pigmented, small cones with a diameter as large as the length of rostral segment IV or less than $2/5$ the length of second joint of hind tarsi, with about 15—19 hairs most of which are long, fine and curved, but a few on the mesal side may be like dorsal abdominal hairs. Cauda rather long for the genus in comparison to its width, more or less low triangular with strongly bulging sides. Legs yellowish brown with the bases and apical parts of the tibiae darker to blackish brown, particularly the femora very conspicuously pantherine spotted, the tibiae to a lesser extent; hairs on the hind tibiae semiobtuse, on basal half $1/6$ — $1/5$ of the local diameter of the tibiae; first tarsal joints with 2—3 short ventral spines and a great number of longer hairs, ventrally $12/5$ times as long as dorsally, $5 1/2$ times as long as the width

at the basal articulation; empodial hairs about $2/3$ of the length of the sclerite on which they are placed.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Diam. siph.	Cauda	Rhin. on IV
			III	IV	V	VI			
1.	4.60	2.00	0.85	0.26	0.35	0.28	0.20	0.26	0 & 0
2.	4.80	2.06	0.88	0.29	0.36	0.28	0.23	0.21	0 & 0
3.	4.77	2.06	0.89	0.29	0.34	0.28	0.23	0.25	1 & 2
4.	4.30	1.91	0.81	0.22	0.34	0.28	0.22	0.25	0 & 0
5.	4.19	1.96	0.83	0.30	0.32	0.28	0.20	0.27	0 & 0
6.	4.73	2.06	0.87	0.30	0.34	0.29	0.19	0.22	0 & 0

(1—6, from *Pinus wallichiana* (syn. *excelsa*), Murree, Pakistan, 3.VII.1964).

Alate viviparous female.

Described from one specimen. Head and thorax darker mottled brown. Dorsal hairs about 50% longer, slightly thinner, their sockets not darkened, not surrounded by brown. Antennal segment III with very unevenly sized rhinaria more or less in a row; hairs on segment III $7/10$ — $7/9$ of its basal diameter. Eyes slightly stalked, the stalk as high as the radius of the eye. Legs very dark with only a part near base of the middle and hind tibiae paler, the spotting not so conspicuous but still very distinct on transparent areas. Wings mutilated, venation uncertain, only subcosta and pterostigma very dark. Other characters as in apterae.

Measurements in mm.

No.	Length of body	Ant.	Ant segments				Diam. siph.	Cauda	Rhin. on		
			III	IV	V	VI			III	IV	V
1.	4.23	1.92	0.75	0.34	0.34	0.26	0.15	0.18	15 & 18	3 & 5	0 & 0

(with the above mentioned apterae).

Discussion. The strongly spotted legs, very small siphuncular cones, and very short hairs on abdominal dorsum and tibiae make identification of this species very easy.

Types. Holotype: apterous viviparous female (measurements no. 1), from *Pinus wallichiana* (syn. *excelsa*), Murree, West Pakistan, 3.VII.1964 (R. VAN DEN BOSCH), P-3c. Paratypes: apterae no. 2—6, and the alate viviparous female with collecting data as for holotype.

Epipemphigus gen. nov.

Fundatrix with four to five segmented antennae, without wax glands, without siphunculi, with 2—3 caudal hairs, with the empodial hairs very short, about $1/4$ — $1/3$ of the length of the claws; embryos inside fundatrices also with short empodial hairs, with wax glands. Alatae of the second generation both as larvae

and as adults with minute, unpigmented and therefore nearly invisible siphunculi, perhaps not always, with simple media in the fore wings, with very distinctly ciliate secondary rhinaria, with very irregular chaetotaxy of the first tarsal joints (e.g. 4, 4, 4; 4, 2, 4; 4, 2, 2, etc.); embryos inside these alatae with mouth parts, and with the empodial hairs at most $\frac{1}{3}$ of the length of the claws.

Type-species: *Pemphigus imaicus* Cholodkovsky, 1912.

Discussion. BÖRNER's (1952) subdivision of Pemphigine genera has the attraction of being very simple. By considering the lengths of the empodial hairs in new born offspring of fundatrigeniae (alatae of the second generation) he discerns two groups, those with short empodial hairs, the Pemphigini, and those with long empodial hairs, the Pachypappini. In BÖRNER & HEINZE (1957) one finds in addition that in Pemphigini the fundatrix and adult fundatrigeniae have long empodial hairs.

A check on empodial hairs in embryos of viviparae showed that the American *Paraprociophilus* Mordv. from *Acer* and *Alnus* indeed have the required very long empodial hairs, and that the Asiatic *Pemphigus baicalensis* Chol. is, like MORDVILKO (1929, 1935) suggested, a true *Paraprociophilus*. However, *Paraprociophilus ucrainensis* Mamontova, 1955, by the same standards is not a *Paraprociophilus* and, since KRZYWIEC (1962) showed that *Mimeuria ulmiphila* del Guercio is the same animal, this species should be placed not in *Paraprociophilus* Mordvilko, 1924, but in *Mimeuria* Börner, 1952.

The new genus unites a number of important characters of BÖRNER's Pachypappini with some characters of his Pemphigini. The fundatrix has no wax glands, which is typical for *Pachypappa* Koch and *Asiphum* Koch, but it has short empodial hairs. The embryos in fundatrigeniae have short empodial hairs, a character of Pemphigini, but also the fundatrix and fundatrigeniae have these short empodial hairs which as Pemphigini they should not have. The very markedly ciliate secondary rhinaria resemble to some extent the rhinaria with nodules, spinules or minute ciliae in some *Prociophilus* Koch and *Stagona* Koch, but again these taxa have embryos with long empodial hairs. Therefore there is no alternative but erecting a new genus for *Pemphigus imaicus* Chol. The species is here redescribed.

Epipemphigus imaicus (Cholodkovsky, 1912)

Fundatrix.

Colour in life unknown. In mounted specimens body oval-rounded, about 2.0—2.25 mm long. Head and sides of prothorax blackish sclerotic; the rest colourless and membranous, but stigmal plates, subanal plate and subgenital plate brown and the sockets of the dorsal hairs somewhat pigmented. No wax glands present. Dorsal hairs numerous, with long hairs of about 0.070—0.085 mm regularly arranged, but besides a great number of scattered shorter and thinner hairs of 0.040—0.070 mm long; the long hairs rather stout at base, but the apices of all hairs drawn out into very fine apices; the sockets of especially the long hairs distinctly pigmented; tergites VII and VIII both only with 4 long hairs of 0.08—0.11 mm long. Antennae as dark as the head, $\frac{1}{6}$ — $\frac{1}{5}$ of length of body, of

4 or 5 segments; in case of 5 segments the division between segments III and IV somewhat abnormal; processus terminalis distinct, about as long as its basal width, with a few rows of spinules that extend somewhat over the under and outer side of basal part of last segment; primary rhinaria with long ciliae, roundish; hairs on flagellum sparse, undulate, up to $1\frac{1}{2}$ times basal diameter of segment III. Rostrum reaching the middle coxae; apical joint about $\frac{9}{10}$ of second joint of hind tarsi, rather acute, or slightly rostrate, with only the 3 subapical pairs of hairs. Cauda inconspicuous, very broad, rather pale, with 2 long hairs. Rudimentary gonapophyses 2. Legs dark, short, thick; first tarsal joints with 2, 2, 2 hairs; tarsi dorsally and laterally not even imbricated, but the second joints with a very small number of spinules on their soles; empodial hairs short, $\frac{1}{3}$ — $\frac{1}{2}$ of the length of the claws.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments		
			III	IV	V
1.	2.20	0.35	0.11	0.12	—
2.	2.07	0.34	0.10	0.11	—
3.	2.21	0.41	0.10	0.05	0.12
4.	2.01	0.39	0.09	0.05	0.13
5.	2.03	0.40	0.09	0.05	0.12

(1—5, from *Populus ciliata*, Murree (7000 ft), West Pakistan, 30.VI.1964).

Embryos in fundatrix.

Antennae of 4 segments. Wax glands on abdomen visible but pattern cannot be made out. Empodial hairs short, half the length of the claws. Antennae with few hairs, but on the very short processus terminalis with some 8—10 hairs, which hairs persist in the later larvae and in the adult.

Alate viviparous female (emigrant).

Colour in life not known. In mounted specimens head and thorax black but a triangular median part on the mesonotum paler to pale; abdomen without local sclerotisation. No wax glands present on head and thorax, but abdomen with small wax glands as follows: marginal ones on segments I—VII; no pleural ones; spinal ones, mostly strongly transverse, fragmented or consisting only of a few cells on tergites I—VI, irregularly present on most of these segments, and rarely also (a few cells only) on tergite VIII. Dorsal hairs inconspicuous, mostly not placed on the wax glands but quite near them, rather short, about 0.020 mm long. Antennae of 6 segments, about $1\frac{1}{2}$ —2 times as long as width of head through the eyes, $\frac{2}{7}$ — $\frac{1}{3}$ of length of body; segment III the longest, with 4—9 rather irregular very narrow rhinaria with wide rims on which rather long, very fine ciliae are implanted; IV with 2—5 rhinaria; V with 0—1, more rarely 2 secondary rhinaria and a primary rhinarium of very irregular shape, encircling about $\frac{2}{3}$ — $\frac{3}{4}$ of the circumference of the segment and covering, measured through the outer rim, about $\frac{2}{5}$ of its length, with little islands or peninsulae sticking out from the margin; segment VI without secondary rhinaria, with a primary rhinarium of

much the same shape and size as, or larger than that on segment V; these primary rhinaria with long, often furcated ciliae, and on the peninsulae sometimes with tree-shaped, many-branched ciliae; processus terminalis markedly thinner at base than in the middle, with 8—10 hairs near apex. Rostrum short, reaching to half-way the middle coxae; last segment acute, conical with slightly convex sides, just less than half as long as second joint of hind tarsi, with only the 3 subapical pairs of hairs. Siphunculi perhaps sometimes present, but not pigmented and so undeveloped that only irregularities in the microstructure indicate their presence. Cauda undeveloped, broad, with 2, sometimes 3 hairs. Legs dark to blackish, slender; the terminal spines of the tibiae not much different from the other hairs near their apex; first tarsal joints with 2—4 hairs, rarely with the same number on all legs, and with spinules; second tarsal joints with transverse lines of spinules, with about 5 pairs of ventral hairs; empodial hairs just less than half as long as the claws. Fore wings with simple media; the veins not bordered.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Rhin. on segments		
			III	IV	V	VI	III	IV	V
1.	2.06	0.66	0.18	0.08	0.10	(0.14 + 0.04)	5 & 6	2 & 2	0 & 0
2.	2.00	0.68	0.18	0.10	0.10	(0.14 + 0.05)	6 & 7	2 & 3	0 & 0
3.	2.19	0.64	0.16	0.08	0.10	(0.14 + 0.05)	6 & 7	2 & 3	1 & 1
4.	2.10	0.70	0.18	0.10	0.11	(0.15 + 0.05)	6 & 7	2 & 3	0 & 1
5.	2.54	0.89	0.22	0.18	0.15	(0.16 + 0.05)	9 & 6	4 & 5	1 & 2
6.	2.44	0.81	0.22	0.13	0.12	(0.16 + 0.05)	9 & 9	4 & 5	1 & 2

(1—4, from *Populus ciliata*, Murree (7000 ft), West Pakistan, 30.VI.1964 (R. VAN DEN BOSCH); 5—6, from *Populus ciliata*, Muklisar, ubi?, 10.V.1930 (C. F. C. BEESON)).

Embryos in emigrants.

Antennae of 4 segments; primary rhinaria both transversely oval, twice as long as wide, that on IV twice as large as that on III; processus terminalis with 5 hairs. Wax glands very large, more or less rectangular with rounded angles, in the transverse rows (of probably 4 per segment) at only about 0.004—0.006 mm from each other, each with a hair. Empodial hairs about $1/3$ — $2/5$ of the length of the claws.

Discussion. CHOLODKOVSKY (1912) gave with the original description a drawing of the emigrants' antennae with their curious primary rhinaria, after material from Dehra-Dun, India. He writes that all the rhinaria are ciliate, but this has apparently escaped the notice of later authors. The gall which he also illustrates resembles that made by *Pemphigus populinigrae* Schrank on *Populus nigra*, irregularly sausage-like on the upperside of the leaf along the mid vein.

Globulicaudaphis gen. nov.

Apterous and alate viviparous females similar to each other in sclerotic pattern (paired, free, or partly fused spinal sclerites on abdominal tergites I—IV; mar-

ginal sclerites) with in apterae somewhat capitate, smooth-shafted hairs (4 spinals, 4 marginal ones on the mentioned tergites); these hairs in alatae with only faintly swollen apices. No dorsal processes present. Head normal, in apterae with the customary faint median suture, with little developed frontal tubercles. Antennae as in *Myzocallis* Pass., with processus terminalis longer than basal part of segment VI, with roundish, faintly ciliate secondary rhinaria in alatae but none in apterae. Triommatidia normal. Wings with normal venation. Siphunculi truncated-conical, fused with the marginal sclerite of tergite VI which bears 2—3 hairs. Cauda not knobbed but consisting of a large smooth membranous colourless bladder on the underside of which a pale, sclerotic, transversely oval, spinulose part with hairs is present. Subanal plate with two widely separated large lobes. Two rudimentary gonapophyses. Subgenital plate not pigmented, normal. First tarsal joints with 2 dorsal and 5 ventral hairs.

First instar larvae with only single pairs of spinal and marginal long knobbed hairs on abdomen, placed singly on dark sclerites. Antennae of 4 segments with

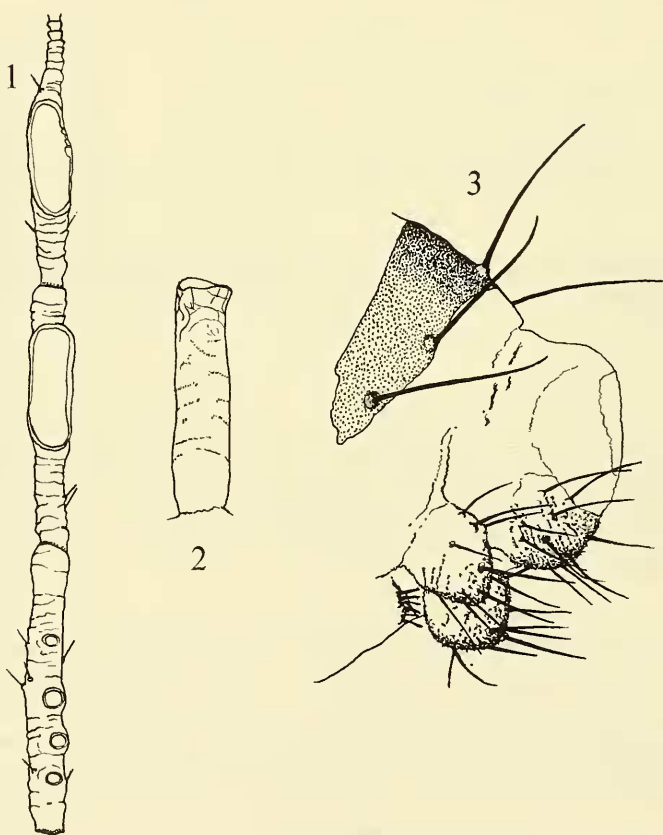


Fig. 1—2. *Ceruraphis eastopi* spec. nov., alate viviparous female. 1, ant. segments IV—VI, $\times 160$; 2, siphunculus, $\times 160$. Fig. 3. *Globulicaudaphis pakistanica* spec. nov., apterous viviparous female, posterior abd. segments, $\times 158$.

on segment III a pigmented spot where that segment subdivides at the next moult. Siphunculi free from the marginal sclerite of tergite VI.

Type-species: *Globulicaudaphis pakistanica* spec. nov.

Discussion. The genus differs from all described aphids by the structure of its anal tergite. There is a considerable resemblance in the sclerotic pattern to that of *Hoplochaetaphis* Aizenberg, 1959, but there the similarity ends. *Myzocallis* Passerini, 1860, is nearly related, and structurally quite close, but it may be separated at once by the caudal structure.

Globulicaudaphis pakistanica spec. nov.

(Fig. 3, Pl. 2)

Apterous viviparous female.

Colour in life "basically pale greenish marked with a darker olive green dorsal pattern and with what appears to be white paired waxy markings running laterally from the head about $\frac{2}{3}$ the length of body. Legs pale with black knees, antennae pale, annulated with dark markings at joints". In mounted specimens (Pl. 2) anterior part of head pale, posterior middle part with a dark smoky area that is partly fused with a similarly pigmented square spinal area on the pronotum, divided in two by a fine membranous suture with halfway a transverse rhomboidal membranous hole; from mesonotum to abdominal tergite IV each segment with a spinal pair of rectangular to square, dark sclerites spinally separated by narrow membranous sutures, but on tergite IV with their posterior halves fused; similar marginal sclerites present on abdominal segments I—III, but segment IV with only the posterior halves of such sclerites; occasionally a few very small round pleural sclerites present on tergites I—IV; on tergite V an irregularly shaped spino-marginal transverse bar which is not connected with the siphunculi; tergites VI and VII with pairs of transverse spinal sclerites and traces of marginal sclerites; tergite VIII with a sclerotic transverse bar; the sclerites from mesonotum caudad slightly darker than those more cephalad, all with the margins darker than the centres. Dorsal hairs rather long, straight, up to 4 times as long as basal diameter of antennal segment III, with slightly widened blunt or knobbed apex, on moderate sockets; the mentioned spinal sclerites on mesonotum each with 3 hairs, from metanotum to tergite IV with 2 hairs, on tergites VI and VII mostly with 2, sometimes with 1 hair; marginal sclerites with 2 or 3 hairs; bar across tergite V with 18—24 hairs; tergite VIII with 8 hairs that may be up to $6\frac{1}{2}$ times the mentioned diameter; pleural hairs irregularly present on tergites I—IV. Ventral hairs fine, acute and inconspicuous, mostly shorter than the mentioned diameter. Head normal, *Myzocallis*-like; antennae subequal in length to body, very pale with the apices of all segments but II, blackish; no rhinaria on segment III; hairs on inner side of segments I and II similar to those on vertex, but shorter; those on inner side of segment III still capitate but small and just shorter than basal diameter of the segment. Rostrum reaching to middle coxae; last segment rather short, subequal to second joint of hind tarsi, with 4—6 hairs besides the 3 sub-apical pairs. Siphunculi truncated-conical, as dark as the dorsal sclerites, with paler

base, approximately smooth, caudad fused with the marginal sclerite of tergite VI, that bears 2—3 hairs. Cauda, if it shrinks in mounts (Fig. 3), seemingly semi-circular with all the 8—12 hairs on the underside; if it does not shrink, cauda globular and the hairs ventrally on basal half. Subanal plate bilobed, the lobes at their bases far apart, curved inwards apicad. Two rudimentary gonapophyses. Legs quite pale with a dark smoky band around each femur a little basad the tip; tibiae spinulose near the tips, the hind tibiae spinulose over distal $\frac{1}{3}$ part; first tarsal joints ventrally with 5 hairs, dorsally with 2; empodial hairs strongly enlarged, flat.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda
			III	IV	V	VI		
1.	1.79	1.63	0.39	0.31	0.31	(0.19 + 0.29)	0.06	0.13
2.	1.51	1.51	0.37	0.27	0.29	(0.18 + 0.28)	0.06	0.13
3.	1.74	1.62	0.45	0.31	0.29	(0.17 + 0.27)	0.06	0.12
4.	1.35	1.39	0.40	0.23	0.26	(0.15 + 0.25)	?	0.11

(1—4, from *Quercus dilatata*?, Murree (7000 ft), Pakistan, 30.VI.1964).

Alate viviparous female.

Described from one specimen. Vertex laterally pale, in the middle dark smoky, like: the middle portions of pronotum, the upper part of the meso- and metanotum, incised spinal bars across tergites I—IV, a spino-pleural bar, not touching the marginal sclerites, across tergite V, small paired spinal sclerites on tergites VI and VII, a narrow bar across tergite VIII and marginal sclerites on tergites IV—VI; the rest pale. Dorsal hairs shorter and thinner, blunt or with incrassate apices. Antennal segment III with 2 and 3 rather large roundish rhinaria near base. Wings with normal venation. The veins hardly visible; basal vein markedly bordered with dark brown; cubitus and three branches of media with dark brown dots at their tips; cubitus with a darkened, bordered base; stigma mostly colourless with the caudal margin bordered and with a large blotch near the base. Hind wings with a narrow dusky border along their apex. Other characters as in apterous female.

Mesasurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda	Rhin. on III
			III	IV	V	VI			
1.	1.85	1.77	0.48	0.34	0.33	(0.19 + 0.29)	0.06	0.12	2 & 3

(with the apterae viviparae).

Larvae.

First instar larvae with all the spinal hairs and most of the marginal hairs on dark sclerites; all the dorsal hairs at equal mutual distances, gradually increasing in length caudad from mesonotum; no pleural hairs present; antennae of 4 segments; segment III with 2 hairs, IV with 1 hair.

Discussion. According to the collector, Dr. R. VAN DEN BOSCH, the species lives in colonies on the undersides of its host plant, *Quercus dilatata*? No ants were attending the aphids.

The species, apart from its cauda and the rather unusual abdominal sclerotisation, looks like a rather normal *Myzocallis*. In larvae the cauda has an almost normal appearance, but even in the first instar the two hairs on the cauda are distinctly on the underside, while in later instars the hairs seem to recede on the underside, because the upperside, almost invisible in dorsal view, protrudes more and more. During mounting the very thin upperside collapses. Afterwards the cauda in dorsal view looks semicircular and rather normal because the upperside is so transparent that the ventral, almost basal, position of the caudal hairs can hardly be detected.

Types. Holotype: apterous viviparous female (measurements no. 1), from *Quercus dilatata*?, Murree (7000 ft), 30.VI.1964 (R. VAN DEN BOSCH), P-30a. Paratypes: 11 apterae and one alata with collecting data as for holotype.

Hyadaphis coriandri (Das, 1918) and *H. tataricae* (Aizenberg, 1935).

A large sample of a small *Hyadaphis* collected near Murree (7500 ft), West Pakistan, 3.VII.1964, led to a closer study of the above two species. The resemblance between material of *coriandri* from various Umbelliferae from India to East Africa, and three samples of apterous *tataricae* from *Lonicera tatarica* from Russia and Poland is so great that they would seem to belong to the same species. The only difference that I could find is in the shape of the siphunculi which in apterous specimens from Umbelliferae usually slightly taper from the base over two-thirds of their length, while in my few specimens from *Lonicera* from Poland and Russia they tend to be wider in the middle than at their basal one-third part. In the Pakistan apterae the siphunculi are almost as in apterae from Umbelliferae, but the cauda is less thick, while in the alatae the rhinaria are more tuberculate and slightly larger than in alatae from Umbelliferae.

These facts suggest that, like *foeniculi* Pass., *H. coriandri* (Das) is a host alternating species, with *Lonicera tatarica* and probably other species of *Lonicera* (in the case of the Pakistan material a climbing one) as primary host plants, and various Umbelliferae as summer hosts. *Hayhurstia tataricae* Aizenberg, 1935, type-species of *Neohayhurstia* Aizenberg, 1954, appears to be a synonym of *Brevicoryne coriandri* Das, 1918, referred to *Hyadaphis* Kirkaldy, 1904. Other synonyms (HILLE RIS LAMBERS, 1948) are *Hyalopterus obscurus* Theobald, 1922, *Hyadaphis conica* Börner, 1932, and *Hyalopterus peucedani* Hall, 1932, and according to EASTOP (1958) also *Hyalopterus carii* Theobald, 1929, and probably *Hyalopterus albus* Monzen, 1929.

Liosomaphis atra spec. nov.

Apterous viviparous female.

In life dark purplish brown except centre of abdominal dorsum which is almost dirty greenish; legs and antennae pale, siphunculi dark on distal half. In mounted

specimens body shortly oval, about 1.30—1.60 mm long. Tergum blackish sclerotic with abdominal tergites I—VI solidly fused to a shield, which like the head, thoracic segments, and abdominal tergites VII and VIII is strongly wrinkled; the middle anterior part of the abdominal shield is often paler. Siphuncular base surrounded by a rather large membranous colourless area. Marginal tubercles apparently absent. Dorsal hairs short, subacute, on abdominal tergite III about half as long as basal diameter of antennal segment III, the 2 hairs on tergite VIII not much longer. Front with the broad, almost straight, middle part projecting beyond the insignificant frontal tubercles. Antennae pale with dark basal segments and somewhat dusky apex, about half as long as body; hairs on segment III about $1/3$ — $2/5$ of basal diameter of the segment. Rostrum long for the genus, reaching to or past the third pair of coxae; last segment about $9/10$ of second joint of hind tarsi, with 2 hairs besides the 3 subapical pairs. Siphunculi rather evenly pale, to dusky with pale base, about $1/5$ of length of body, twice the length of the cauda, with basal $2/7$ — $1/3$ consisting of an almost cylindrical stem which is $1\frac{1}{4}$ times as thick as the hind tibiae; from the stem they abruptly increase in width to the middle of their length, to a maximum of about twice the width of the stem from where they more gradually decrease in width to the small flange where they are as thick as the hind tibiae; most of the swelling is, as usual, on the inner side; surface quite smooth with only at the very apex some transverse striae. Cauda cylindrical, or near base constricted, with distal half to one-third part tapering to the semiobtuse apex, of the colour of the distal part of the siphunculi, with 5 hairs. Legs pale to evenly pale brownish yellow; first tarsal joints with 3, 3, 3 hairs.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda
			III	IV	V	VI		
1.	1.54	0.78	0.19	0.09	0.11	(0.11 + 0.16)	0.32	0.17
2.	1.46	0.74	0.18	0.10	0.10	(0.11 + 0.14)	0.32	0.15
3.	1.53	0.70	0.18	0.09	0.10	(0.10 + 0.13)	0.31	0.16
4.	1.57	0.81	0.19	0.11	0.11	(0.12 + 0.18)	0.33	0.18
5.	1.54	0.76	0.20	0.11	0.10	(0.11 + 0.13)	0.34	0.17
6.	1.36	0.64	0.16	0.07	0.09	(0.09 + 0.14)	0.29	0.14

(1—6, from *Berberis* sp., Murree (7000 ft), West Pakistan, 30.VI.1964).

Discussion. Recently some more *Liosomaphis* species have been described from Asia (*L. lydiae* Narzykulov, 1957, later made the type of *Berberidaphis* Narzykulov, 1960; *L. turanicus* Narzykulov, 1960; and *L. himalayensis* Basu, 1964); all are pale insects, without strong sclerotisation of the dorsum. As to structure of siphunculi and cauda our species most strongly resembles *L. turanicus* Narzykulov, also in the length of the processus terminalis. In *L. himalayensis* the antennae and the processus terminalis are absolutely and relatively longer. The rostrum of our new species is conspicuously longer than that in the other species in which it barely reaches past the middle coxae.

Types. Holotype: apterous viviparous female (measurements no. 1), from *Berberis* sp., Murree (7000 ft), West Pakistan, 30.VI.1960 (R. VAN DEN BOSCH), P-30b. Paratypes: apterous viviparous females with data as for holotype.

***Macrosiphum pachysiphon* spec. nov.**

Apterous viviparous female.

In life very pale pink with black siphunculi. In mounted specimens body about 3.0—3.5 mm long. Tergum membranous and almost colourless with the exception of vague smoky roundish pleural intersegmental sclerites on abdomen and hardly more distinct antesiphuncular sclerites, but without marginal or postsiphuncular sclerites. Dorsal hairs numerous and conspicuous, stiff, blunt, on tergite III about $11\frac{1}{4}$ — $11\frac{1}{9}$ times as long as basal diameter of antennal segment III; marginal hairs quite numerous, tergite III often with 7—9 hairs on each side, tergite VIII with 8—10 hairs. Marginal tubercles small and flat, rather regularly present on tergites II—IV. Frontal tubercles strongly diverging, little developed; depth of frontal furrow only about $\frac{1}{6}$ — $\frac{2}{11}$ of the distance between the antennal bases, with flat to concave bottom; each frontal tubercle with 5—8 hairs, nearly all on the underside. Antennae pale with apex of segment III dusky, that of IV and V dark brownish black and the whole of VI blackish, about $\frac{7}{8}$ —1 times length of body; IIIrd segment smooth with the very base imbricated, with 2—7 (average of 26 antennae: 4.0) curiously sunk rhinaria on slightly elevated parts of the segment near its base, and with numerous, some 30, hairs the longest of which are as long as basal diameter of the segment; processus terminalis $4\frac{1}{3}$ —5 times length of base of last segment. Rostrum reaching just past the middle coxae; last segment as in many *Sitobion* spp. somewhat constricted at base, not very blunt, rather short, about $\frac{2}{3}$ of second hind tarsal joint, with 4—7 hairs besides the 3 subapical pairs. Siphunculi very conspicuously black, thick, evenly tapering, at base $2\frac{1}{2}$ —3 times as thick as the hind tibiae, at apex $11\frac{1}{10}$ — $11\frac{1}{5}$ times as thick as that joint, about $\frac{1}{4}$ of length of body, superficially but sharply imbricated from base to about distal $\frac{1}{7}$ part which is distinctly reticulated, with very small flange, about $1\frac{4}{5}$ times as long as the cauda. Cauda pale, usually constricted at basal $\frac{1}{3}$ part, rather slender, bluntish, with about 13—17 hairs. Legs long, pale with only the apices of the tibiae and the tarsi dark smoky; first tarsal joints with 3, 3, 3 hairs.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda	Rhin. on III
			III	IV	V	VI			
1.	3.09	2.92	0.77	0.52	0.51	(0.17 + 0.71)	0.81	0.45	3 & 4
2.	3.49	3.09	0.83	0.61	0.51	(0.17 + 0.73)	0.89	0.52	5 & 6
3.	3.35	3.07	0.82	0.56	0.49	(0.17 + 0.79)	0.87	0.49	5 & 7
4.	3.14	2.77	0.76	0.49	0.44	(0.15 + 0.69)	0.87	0.48	2 & 3
5.	3.09	3.14	0.84	0.60	0.51	(0.16 + 0.78)	0.85	0.47	5 & 6
6.	3.01	3.03	0.83	0.54	0.51	(0.16 + 0.75)	0.88	0.46	3 & 4

(1—6, from *Rubus* sp., Murree (7000 ft), West Pakistan, 30.VI.1964).

Alate viviparous female.

Colour in life not known, but abdomen presumably as in apterae. In mounted specimens head and thorax brownish, the abdomen with an elaborate, smoky sclerotic pattern, consisting of irregularly fragmented spinal sclerites, bearing 1—3 hairs each, very small pleural sclerites, rather large transverse pleural inter-segmental sclerites and squarish marginal sclerites with many hairs. Antennae with the basal segments and the very base of segment III brownish like the head, the rest dark to black, but segment III usually distinctly blacker than segments IV and V; segment III with about 20—30 rhinaria that are larger and less sunken than in apterae, along one side of the segment, in irregular arrangement on basal half but in single file on distal half. Siphunculi more cylindrical and thinner than in apterae with distal $\frac{1}{6}$ part reticulated. Cauda thinner and more acute than in apterae. Legs with the femora blackish brown with pale base, tibiae brownish yellow with blackish apices. Wings with normal venation, but stigma elongated and the same dark or blackish colour as the subcostal vein system, so that the wings seem to have an anterior dark margin. Other characters more or less as in apterae viviparae.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda	Rhin. on III
			III	IV	V	VI			
1.	2.96	3.17	0.83	0.64	0.53	(0.17 + 0.79)	0.69	0.37	19 & 27
2.	3.08	2.98	0.89	0.63	0.54	(0.16 + 0.74)	0.67	0.37	22 & 24
3.	2.71	3.08	0.73	0.67	0.50	(0.16 + 0.80)	0.61	0.30	24 & 28
4.	2.45	2.84	0.66	0.59	0.49	(0.15 + 0.73)	0.59	0.28	25 & 29

(1—2, with apterae no. 1—6; 3—4, from *Rubus lasiocarpus*, Shillong, Assam, India, 1964 (Commonwealth Inst. of Biol. Control)).

Discussion. According to Dr. R. VAN DEN BOSCH, who collected the Pakistan material, this aphid lives in tight colonies on the tender canes of the host plant. His sample consisted of apterae with two alatae, presumably of the second generation, but the sample from Assam consisted mainly of alatae with a few damaged apterae, of which unfortunately the date of collecting was not given.

In many respects this species resembles a *Sitobion*, e.g. by the last rostral segment, the black siphunculi, the sclerotic pattern of the abdomen in alatae, etc. But the long and very numerous hairs on body and antennae make it impossible to place it in *Sitobion* Mordv. The very pale integumentum of apterae with which the very thick black siphunculi strongly contrast distinguish the species from all known relatives. Alatae can easily be recognized by their very dark subcostal vein system and blackish pterostigma.

Types. Holotype: apterous viviparous female (measurements no. 1), from *Rubus* sp., Murree (7000 ft), West Pakistan, 30.VI.1964 (R. VAN DEN BOSCH), P-VI-30-j. Paratypes: apterous and alate viviparae with data as for holotype. Further material: numerous alatae and some damaged apterae viviparae from *Rubus lasiocarpus*, Shillong, Assam, India, 1964 (Commonwealth Inst. Biol. Control).

Matsumuraja capitophoroides spec. nov.

Apterous viviparous female.

In life pale yellow with only the apices of antennal segments III—V, the part near the primary rhinaria on VI, and the distal part of the processus terminalis dark to blackish. In mounted specimens body elongated oval, very variable in length, from 1.30 to 2.25 mm long. Tergum colourless, not visibly sclerotic but actually thickened and marginally with semiglobular papillae which in dorsal view look like small thick round to oval rings. Dorsal hairs thick (0.005 mm) and stiff, rather variable in length, so that the spinal hairs on abdominal tergite III are about 0.035 mm, the pleural hairs, if present, 0.030 mm, the hairs on tergite VIII about 0.065 mm; in large specimens (second generation) pleural hairs often all present from tergite I to VI, appearing as duplicated spinal hairs, but in small specimens sometimes nearly all pleural hairs absent; marginal hairs in single pairs on each of the anterior abdominal segments, similar to the spinal hairs; all dorsal hairs distinctly knobbed, placed on strong conical sockets which are on top of short processes which, including the socket, in the case of spinal hairs are about as long as the hair on top. Head, except on the middle of vertex, quite rough by small spinules, with markedly diverging frontal tubercles; depth of frontal furrow about $1/7$ of the distance between the antennae; numerous capitate hairs on strong sockets present on upper and under side of the head, also on the front and on the inner and under side of the frontal tubercles. Antennae $2/3$ — $7/10$ of length of body, pale with pigmentation as in the living insect; first segment on inner side with a sausage-shaped, quite blunt processus about as long as the segment, bearing 2—3 knobbed hairs; flagellum lightly imbricated; segment III with a few rather thin knobbed hairs of various length, the thickest of which are about $3/7$ of the diameter of the segment at its widened very base. Rostrum reaching just past the middle coxae; last segment with almost straight, sometimes just concave sides, just swollen near apex, and therefore not acute, about as long as second joint of hind tarsi, with 2 hairs besides the 3 subapical pairs, one of which is placed far basad. Siphunculi pale with only the very apex dusky, about $1/4$ — $2/7$ of length of body, lightly bluntly imbricated from base, but apical $1/7$ part smooth, cylindrical and about $1\frac{1}{2}$ times as thick as the hind tibiae, to just swollen on distal half where the diameter may be up to $1\frac{1}{10}$ times the smallest on basal half, slightly attenuated ($9/10$ of minimum width on basal half) just below the small flange, 3— $3\frac{1}{2}$ times as long as the cauda. Cauda pale, bluntly triangular with slightly convex sides, with 4 hairs. Legs rather long, pale with dusky tarsi; first tarsal joints with 3, 3, 2 hairs.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda
			III	IV	V	VI		
1.	1.51	1.07	0.24	0.16	0.16	(0.10 + 0.30)	0.34	0.12
2.	1.49	1.12	0.26	0.15	0.19	(0.10 + 0.30)	0.39	0.12
3.	2.06	1.33	0.31	0.21	0.22	(0.12 + 0.33)	0.50	0.14
4.	1.97	1.39	0.31	0.21	0.23	(0.12 + 0.37)	0.49	0.14
5.	2.13	1.40	0.32	0.21	0.22	(0.12 + 0.37)	0.47	0.16
6.	2.12	1.41	0.33	0.22	0.22	(0.13 + 0.37)	0.51	0.15

(1—2, from *Rubus* sp., Murree (7500 ft), West Pakistan, 5.VII.1964; 3—4 as 1—2, but 27.VI.1964).

Discussion. According to Dr. R. VAN DEN BOSCH this species lives in often large colonies on the underside of the leaves of its host plant, a *Rubus* species that apparently also serves as host to *Macrosiphum pachysiphon* spec. nov., of which a sample was received from *Rubus lasiocarpus*. It would seem that this species does not have host alternation as suggested by TAKAHASHI (1959) for *Matsumuraja rubifoliae* Tak. The sample collected by Dr. VAN DEN BOSCH on 30.VI on *Rubus* consisted of apterae with one alatoid nymph. In a species with host alternation such a composition of the population on its secondary host would seem unlikely in that area at that time, because many other aphid species were only in their second generation. From samples received from other sources it appears that the species is widely distributed along the southern slopes of the Himalayas.

The present species can be distinguished from those species of which I have material available with the following key:

Key to *Matsumuraja* Schumacher (apterae viviparae)

- 1 (2). Antennal segment I at inner apex merely very angular or slightly protracted, not with a finger-shaped process that is much longer than its width halfway its length. On *Rubus peltatus*. Japan. . . . *M. sorini* Tak.
- 2 (1). Antennal segment I at inner apex with a long finger-shaped process that is longer than its width halfway its length.
- 3 (6). Abdominal tergites I—V without long capitate hairs on strong sockets or processes, and only the short marginal hairs on these tergites, though short, sometimes capitate. Tergites VII and VIII always with long capitate hairs on processes, and sometimes also tergite VI.
- 4 (5). Tergites VI—VIII with long capitate hairs. Siphunculi not or hardly swollen. Antennal segment III with the apical portion dark to blackish. On *Rubus palmatus*. Japan. *M. rubiphila* Tak.
- 5 (4). Tergites VII and VIII with long capitate hairs. Siphunculi thick, distinctly somewhat swollen. Antennal segment III with pale apex. On *Rubus* sp. Japan. *M. nuditerga* H.R.L.
- 6 (3). At least some spinal hairs on tergites I—V with capitate hairs on processes.
- 7 (8). Marginal processes very long, the posterior ones as long as the siphunculi, or rather two of the marginal processes are the siphunculi. On *Clethra*. Japan. According to TAKAHASHI (1959): fundatrices of: *M. rubifoliae* Tak.
- 8 (7). All marginal and spinal processes, if present, very much shorter than the siphunculi.
- 9 (10). Marginal processes on abdominal segments IV and V about as long as last rostral segment. Processus on antennal segment I very slenderly conical, almost pointed. On *Rubus* sp. Formosa. . . . *M. rubicola* Tak.
- 10 (9). Marginal processes absent, but the marginal hairs on strong conical

sockets. Processus on antennal segment I more cylindrical, or near apex thicker than halfway its length.

- 11 (12). Long spinal processes present which are more than 3 times as long as their width in the middle and on abdominal tergite VI nearly half as long as the siphunculi. On *Rubus*. Japan. . . . *M. rubi* Mats.
- 12 (11). No long spinal processes present, but all the dorsal hairs on conical sockets, that together with the short processus are about as long as the hair on top.
- 13 (14). Siphunculi with about distal $\frac{1}{5}$ part blackish, distinctly swollen, thicker at distal $\frac{1}{3}$ part than at basal $\frac{2}{5}$ part. Rostrum not with acutely triangular apical segment. Spinal hairs on abdominal tergites III—IV normally in single pairs. On *Rubus*. Japan. . . . *M. rubifoliae* Tak.
- 14 (13). Like the preceding, but siphunculi with the apices hardly darker or only the very apex dusky, curved inwards, from the strongly tapering base almost completely cylindrical with a constriction at the tip. Rostrum with acutely triangular last segment. A few or all spinal hairs cephalad of the siphunculi duplicated. On *Rubus* sp. W. Pakistan.
. *M. capitophoroides* spec. nov.

In the above key *Matsumuraja formosana* Tak., 1925, is not considered because I have no authentic specimens. According to the description it resembles *M. capitophoroides* spec. nov. closely, but the spinal processes on the anterior abdominal tergites must be much larger, as long as or longer than the second antennal segment, while spinally additional capitate hairs may occur.

Types. Holotype: apterous viviparous female (measurements no. 1), from *Rubus* sp., Murree (7500 ft), West Pakistan, 5.VII.1964. Paratypes: apterous viviparous females with data as for holotype, and others collected on 27.VI.1964 and 30.VI.1964.

Periphyllus vandenboschi spec. nov.

Apterous female.

Colour in life not known, but probably light green with pitch black siphunculi. In mounted specimens body about 1.35—2.00 mm long, rather slender. Tergum completely unpigmented with antennal segment I brown, and the apex of segment V and the whole segment VI dark to blackish. Hairs on dorsum numerous and long, the long spinal hairs on abdominal segment III 6—7 times as long as basal diameter of antennal segment III, with extremely fine apices. Front straight to just concave. Antennae $\frac{3}{4}$ — $\frac{7}{8}$ of length of body; hairs on segment III numerous, up to $5\frac{1}{2}$ —6 times basal diameter of the segment; base of segment VI with 2 hairs, the longest of which is about 0.12 mm, 14 times diameter of processus terminalis, $1\frac{1}{5}$ times the length of the basal part of the segment; the shortest of the two 0.09 mm; processus terminalis about as long as antennal segment III, 3—4 times basal part of segment VI. Rostrum reaching to the hind coxae; last segment rather thick and obtuse, just shorter than second joint of hind tarsi, with 4—7 hairs besides the 3 subapical pairs. Siphunculi deep black, $\frac{2}{3}$ of the second

joints of hind tarsi in length, cylindrical or with smallest width in the middle and there about 0.045 mm thick, only on the wide flange reticulated with one row of cells with sometimes one or two cells of a second row. Cauda pale, rather well developed, $1\frac{1}{2}$ — $2\frac{2}{3}$ times as long as its basal width, semioval to semicircular, not constricted at base, with many hairs. Legs pale with the tarsi dusky, rather slender; first tarsal joints with 5, 5, 5 hairs.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments				Siph.	Cauda
			III	IV	V	VI		
1.	1.63	1.32	0.36	0.24	0.17	(0.09 + 0.34)	0.09	0.07
2.	1.58	1.29	0.36	0.21	0.17	(0.09 + 0.34)	0.09	0.07
3.	1.68	1.33	0.36	0.23	0.16	(0.11 + 0.35)	0.09	0.07
4.	1.93	1.48	0.39	0.26	0.21	(0.10 + 0.37)	0.09	0.07
5.	1.40	1.14	0.30	0.18	0.15	(0.09 + 0.32)	0.07	0.05
6.	1.84	1.44	0.38	0.24	0.20	(0.11 + 0.37)	0.08	0.07

(1—3, *Acer* sp., Murree (7500 ft), West Pakistan, 4.VII.1964; 4—6, idem but 27.VI.1964).

Larvae.

First instar larvae with the siphunculi black as in adults, all with long and fine hairs, without pleural hairs on abdomen, with 2 caudal hairs, with 4 hairs on the subanal plate; hairs on last antennal segment (fourth) as in adults.

Discussion. Two large samples of this aphid, consisting only of apterae viviparae and larvae were collected on the petioles of an *Acer* sp. near Murree. The Director of the Royal Botanic Gardens, Kew, England, most kindly supplied the information that the most likely *Acer* spp. in the vicinity of Murree would be *A. caesium* Wall. ex Brand, *A. villosum* Wall. or *A. pictum* Thunb. The aphid colonies were heavily attended by ants.

Very few *Periphyllus* species have only 5 hairs on the first tarsal joints normally, though this may occur in small specimens of some species that normally have 7 tarsal hairs. Characteristic for the adult apterae are the complete absence of local sclerotisation or pigmentation in contrast to the quite black cylindrical siphunculi, the embryos with normal hairs, and the length and interrelation of length of the two long hairs on the basal part of antennal segment VI. In most respects the species resembles *P. obscurus* Mamontova from *Acer campestre*, but that species has conical and slightly more reticulated siphunculi, pigmentation on the head and abdominal tergite VIII, faint sclerites at the bases of the dorsal hairs, and 7, 7, 7 hairs on the first tarsal joints. A nearly related species from Iran has normally 3, considerably longer, hairs on the basal part of last antennal segment, 7, 7, 7 hairs on the first tarsal joints, and aestivating larvae with foliate marginal hairs.

The species is named after Dr. R. VAN DEN BOSCH, Berkeley, California, who discovered this and nearly all the other species described in this paper.

Types. Holotype: apterous viviparous female (measurements no. 1), from *Acer*

sp., Murree (7500 ft), West Pakistan, 4.VII.1964 (R. VAN DEN BOSCH), P-VII-4a. Paratypes: many apterous viviparae with data as for holotype, and others collected on 27.VI.1964 (R. VAN DEN BOSCH), P-VI-27a.

Pseudessigella gen. nov.

Body elongated, narrow, with few hairs. Eyes without distinct triommatidia. Antennae in adults of 5 segments. Last rostral segment not subdivided, very short and blunt. Siphunculi, rimmed pores on a very small, hairless sclerite. Cauda rounded. First tarsal joints with 5 ventral hairs, in apterae not with dorsal hairs, those of hind legs ventrally $1\frac{1}{2}$ times as long as dorsally. Claws not with cleft apices.

Type-species: *Pseudessigella brachychaeta* spec. nov.

Discussion. The genus is nearly related to *Eulachnus* del Guercio. It lives like that genus on the needles of *Pinus* spp. It differs from *Eulachnus* in having 5 instead of 6 antennal segments and in that respect agrees with the American genus *Essigella* del Guercio which it also strongly resembles in the extremely short processus terminalis. It differs from *Essigella* in having claws with simple, acute apices.

Pseudessigella brachychaeta spec. nov.

Apterous viviparous female.

In life pale green. In mounted specimens body about 2.0—2.6 mm long, very elongated, about $3\frac{1}{2}$ times as long as its maximum width. Tergum membranous, with extremely small fuscous sclerites around the bases of the dorsal hairs, with similarly coloured roundish pleural and marginal intersegmental sclerites ("Muskelplatten") of about 0.02 mm in diameter, and with pleural, longitudinal groups of 2—3 irregular sclerites pigmented like the smoky stigmal plates. Dorsal hairs on abdominal tergite III about 14 in number, 8 of which are marginal, curved, with incrassate apex, only about 0.0125—0.017 mm long. Head pale brownish yellow, dorsally and frontally with hairs like the dorsal ones, ventrally with thin acute hairs of about 0.046 mm long. Front strongly convex. Antennae short and curved, evenly pale brownish yellow with slightly darker apex, $\frac{1}{5}$ — $\frac{1}{4}$ of length of body, about $1\frac{1}{3}$ times as long as the width of the head across the eyes, without secondary rhinaria; segment I and II smooth, but the other segments very inconspicuously imbricated; primary rhinaria of segment IV about equal to basal diameter of segment V, hardly larger than the primary rhinarium of segment V which is only $\frac{1}{2}$ of its diameter from the tip of the segment, and round in shape; hairs on segment III sparse, blunt, short, only half as long as the diameter of the segment as its narrowed base. Rostrum reaching beyond the middle coxae; apical segment very blunt, short, about $\frac{1}{3}$ of the second joint of hind tarsi, with only the 3 subapical pairs of hairs. Siphunculi small, only 0.02 mm in diameter, hardly elevated, placed on a pale brown hairless sclerite of about 0.042—0.046 mm in diameter. Abdominal tergite VIII consisting of one wide dusky sclerotic ring, with 16—18 very short hairs. Cauda semilunar, blunt, thick, over twice as wide as

long, with some 30 hairs of various lengths. Legs pigmented like the head, with the fore and middle femora very strongly swollen on basal $1/4$ part dorsally, ventrally almost straight; hind tibiae nearly twice as long as the middle tibiae; first tarsal joints elongate, those of hind legs ventrally $11/2$ times as long as dorsally, $21/2$ times diameter of the joint, with 3 (one short, two long) hairs ventro-apically and 2 hairs ventrally more basad; second tarsal joints only at the very apex darkened; claws slender and acute.

Measurements in mm.

No.	Length of body	Ant.	Ant. segments			Diam. siph.	Cauda
			III	IV	V		
1.	2.25	0.49	0.20	0.08	0.09	0.02	0.07
2.	2.44	0.52	0.21	0.09	0.10	0.02	0.07
3.	2.09	0.47	0.18	0.08	0.09	0.02	0.07
4.	2.17	0.52	0.20	0.08	0.10	0.02	0.07
5.	2.53	0.55	0.21	0.09	0.11	0.02	0.07
6.	2.43	0.51	0.20	0.09	0.10	0.02	0.07

(1—6, from *Pinus wallichiana* (*P. excelsa*), Murree, West Pakistan, 4.VII.1964).

Discussion. This aphid lives on the very long needles of the host plant, like members of the genera *Eulachnus* and *Essigella*. It is easy to distinguish the species from related aphids: no other species of this group is known with simple, sharp claws and five antennal segments.

Types. Holotype: apterous viviparous female (measurements no. 1) from *Pinus wallichiana* (*excelsa*), Murree, West Pakistan, 4.VII.1964 (R. VAN DEN BOSCH), P-VII-4d. Paratypes: apterae viviparae with data as for holotype.

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